

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed January 27, 2005. Claims 14-30 were previously withdrawn and claims 1-13 remain pending in the present application.

In the Office Action, claims 1-13 have been preliminarily rejected under 35 USC § 103(a). The Applicants have amended claims 1 and 3, cancelled claim 2 without prejudice, and added claims 31-34. Applicants traverse all of the rejections of the Office Action. Reconsideration and allowance of the subject application and presently pending claims 1, 3-13 and 31-34 is respectfully requested.

Summary of the Present Invention

The presently pending application discloses methods for coating surfaces with metal and products made thereby. Specifically, a light-sensitive, or photo-sensitive, bonding material, such as an emulsion or a photopolymer film, is used to adhere metal directly to a substrate to provide various forms of metal coatings on the substrate. The light-sensitive bonding material is generally applied directly between the substrate and the metal layer. The light-sensitive bonding material is applied under conditions (e.g., lighting and temperature) that prevent premature curing of the light-sensitive bonding material. The light-sensitive bonding material applied between the substrate and metal is then dried. Thereafter, the applied light-sensitive bonding material is exposed to light to cure the light-sensitive bonding material in selected areas, causing the metal to adhere to the substrate in the selected

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areas. It should be noted that these above-mentioned process requires few steps, thereby making the process desirable.

#### I. Response to Claim Rejections Based On Obviousness

In the Office Action, claims 1-13 have been rejected under 35 U.S.C. § 103(a). Specifically, these claims have been rejected as being unpatentable over U.S. Patent No. 5,891,289 to Zemel (hereafter, "Zemel"), in view of U.S. Patent No. 5,378,298 to Williams, *et al.* (hereafter, "Williams"), and in further view of U.S. Patent No. 5,951,801 to Weissenfluh, *et al.* (hereafter, "Weissenfluh").

It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly or explicitly, all elements/features/steps of the claim at issue. See, e.g., In re Dow Chemical, 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988), and In re Keller, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

#### Discussion of the Zemel Reference

Zemel is directed to a method of transferring metal leaf to a substrate. The method consists of the steps of: providing a transfer sheet having an adhesive layer, where the adhesive is dry; transferring the adhesive to a substrate by applying pressure to a side of the transfer sheet that is opposite the dry adhesive; removing the transfer sheet, thereby leaving the adhesive; and, applying metal leaf to the adhesive.

It is noted that the transfer paper may be a water release transfer paper that is activated when wet with water. When the transfer paper is a water release transfer paper the transfer paper is allowed to be wet after applying pressure, and then the release paper is removed. Thereafter, the adhesive is allowed to dry. Therefore, Zemel does not require curing and it does not use a light sensitive bonding material.

### Discussion of the Williams Reference

Williams is directed to a radiation sensitive adhesive composition and method of photoimaging the same. The method consists of the steps of: coating a substrate with a layer of photopolymeric adhesive; partially curing the adhesive by either soft baking the adhesive at a moderate temperature or exposing the adhesive to a low level UV exposure; masking the adhesive with a phototool and imaging, or direct imaging, thereby again partially curing the adhesive, however, only the exposed portion of the adhesive; using a solvent to dissolve away the unexposed portions of the adhesive; attaching a second material to the remaining adhesive; and completely curing the remaining adhesive by either using heat or via UV exposure.

Therefore, as shown above, the above-mentioned method requires many steps and multiple levels of curing.

### Discussion of the Weissenfluh Reference

Weissenfluh is directed to a method of joining a metal foil with a foil of a synthetic material. The method consists of the steps of: subjecting a synthetics foil to a corona discharge on a narrow border region, where, as is known by those having

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ordinary skill in the art, a corona discharge is an electrical discharge accompanied by ionization of surrounding atmosphere; adding an adhesive to the synthetics foil; pressing the metal foil and the synthetics foil together; and irradiating the remaining structure by ultraviolet radiation, thereby causing polymerization of the adhesive.

#### A. Claim 1

Amended independent claim 1 reads:

1. A method of coating a substrate with a metal layer, comprising the steps of:

*applying a wet light-sensitive bonding material between said substrate and said metal layer under lighting conditions to prevent premature curing of said bonding material and allowing said bonding material to remain wet, thereby forming a metal-coated substrate;*

*drying said wet light-sensitive bonding material at a temperature compatible with said bonding material and under lighting conditions to prevent premature curing of said bonding material; and*

*exposing said metal-coated substrate to a light source having an intensity and for a period of time sufficient to cure at least portions of said light-sensitive bonding material.*

*(Emphasis Added)*

The Applicants respectfully submit that neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest all elements of amended independent claim 1. Specifically, neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest applying a wet light-sensitive bonding material between a substrate and a metal layer under lighting conditions to prevent premature curing of the bonding material and allowing the bonding material to remain wet. In addition, neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest drying the wet light-sensitive bonding material at a temperature

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compatible with the bonding material and under lighting conditions to prevent premature curing of the bonding material.

As has been demonstrated above in the summaries of the above-mentioned references, Zemel provides for a transfer sheet having an adhesive layer, where the adhesive is dry; transferring of the adhesive to a substrate by applying pressure to a side of the transfer sheet that is opposite the dry adhesive; removing the transfer sheet, thereby leaving the adhesive; and, applying the metal leaf to the adhesive. It is noted that the transfer paper may be a water release transfer paper that is activated when wet with water. When the transfer paper is a water release transfer paper the transfer paper is allowed to be wet after applying pressure, and then the release paper is removed. Thereafter, the transferred adhesive layer is allowed to dry and then metal leaf is applied. Therefore, Zemel does not require curing and it does not use a light sensitive bonding material. In addition, since the transferred adhesive is transferred as a dry layer, the metal leaf only adheres to the top surface of the adhesive layer.

In addition, Williams provides a radiation sensitive adhesive composition and method of photoimaging the same. The method consists of the steps of: coating a substrate with a layer of photopolymeric adhesive; **partially curing the adhesive by either soft baking the adhesive at a moderate temperature or exposing the adhesive to a low level UV exposure;** masking the adhesive with a phototool and imaging, or direct imaging, thereby **again partially curing the adhesive,** however, only the exposed portion of the adhesive; using a solvent to dissolve away the unexposed portions of the adhesive; attaching a second material to the remaining

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adhesive; and completely curing the remaining adhesive by either using heat or via UV exposure. Therefore, as shown above, the above-mentioned method requires many steps and multiple levels of curing.

Further, Weissenfluh is directed to a method of joining a metal foil with a foil of a synthetic material. The method consists of the steps of: subjecting a synthetics foil to a corona discharge on a narrow border region, where, as is known by those having ordinary skill in the art, a corona discharge is an electrical discharge accompanied by ionization of surrounding atmosphere, and a corona is an electrical discharge accompanied by ionization of surrounding atmosphere; adding an adhesive to the synthetics foil, pressing the metal foil and the synthetics foil together; and irradiating the remaining structure by ultraviolet radiation, thereby causing polymerization of the adhesive.

Therefore, neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest applying a wet light-sensitive bonding material between a substrate and a metal layer under lighting conditions to prevent premature curing of the bonding material and allowing the bonding material to remain wet. In addition, neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest drying the wet light-sensitive bonding material at a temperature compatible with the bonding material and under lighting conditions to prevent premature curing of the bonding material.

In addition, the Office Action reads:

Hence, one having ordinary skill in the art at the time of the invention would have been motivated to utilize a light sensitive adhesive as taught by Williams et al or Weissenfluh et al to produce the laminate taught by Zemel wherein Williams et al specifically teach utilizing a mask technique to produce a desired pattern and one skilled in the art at the

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time of the invention would have been motivated to utilize corona discharge treatment to improve adhesion and to determine the manner by which to expose the light sensitive adhesive and remove unexposed areas to produce the desired product.

The Applicants respectfully submit that, as is shown above, the method of claim 1 does not use a "laminate" as taught by Zemel. Zemel teaches use of an adhesive layer, not a wet light-sensitive bonding material. In addition, the method of the present invention does not use a corona discharge. As has been mentioned above, a corona discharge is an electrical discharge accompanied by ionization of surrounding atmosphere. It is clear that the method of claim 1 does not use a corona discharge, but instead, cures using a light source.

Therefore, since neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest applying a wet light-sensitive bonding material between a substrate and a metal layer under lighting conditions to prevent premature curing of the bonding material and allowing the bonding material to remain wet, or drying the wet light-sensitive bonding material at a temperature compatible with the bonding material and under lighting conditions to prevent premature curing of the bonding material, the Applicants respectfully submit that claim 1 should be allowed and allowance is respectfully requested .

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B. Claim 3

Amended dependent claim 3 reads:

3. The method of claim 1 wherein the step of applying said light-sensitive bonding material between said substrate and said metal layer includes *wetting a surface of said substrate*, applying a light-sensitive photopolymer film to said surface of said substrate, *wetting said photopolymer film*, and applying said metal layer to said wet photopolymer film.

*(Emphasis Added)*

The Applicants respectfully submit that neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest the steps of wetting a surface of the substrate, applying a light-sensitive photopolymer film to the surface of the substrate, wetting the photopolymer film, and applying the metal layer to the wet photopolymer film. In fact, the only reference that discloses, teaches, or suggests anything even vaguely similar is Zemel. It should be noted, however, that, as has been mentioned above, Zemel teaches the steps of providing a transfer sheet having an adhesive layer, where the adhesive is dry; transferring the adhesive to a substrate by applying pressure to a side of the transfer sheet that is opposite the dry adhesive; removing the transfer sheet, thereby leaving the adhesive; and, applying metal leaf to the adhesive.

It is noted that the transfer paper of Zemel may be a water release transfer paper that is activated when wet with water. When the transfer paper is a water release transfer paper the transfer paper is allowed to be wet after applying pressure, and then the release paper is removed. Thereafter, the adhesive is allowed to dry after which the metal leaf may be applied.

Alternatively, the method of claim 3 teaches the steps of wetting a surface of the substrate, applying a light-sensitive photopolymer film to the surface of the wet

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substrate, wetting the photopolymer film, and applying the metal layer to the wet photopolymer film. There is no drying of the wet photopolymer film prior to applying the metal layer.

Therefore, the applicants respectfully submit that since neither Zemel, Williams, nor Weissenfluh disclose, teach, or suggest the steps of wetting a surface of the substrate, applying a light-sensitive photopolymer film to the surface of the substrate, wetting the photopolymer film, and applying the metal layer to the wet photopolymer film, claim 3 should be allowed, and allowance of claim 3 is respectfully requested.

In addition to the abovementioned, the Applicants respectfully submit that since claim 3 depends on independent claim 1, claim 3 contains all limitations of independent claim 1. Since independent claim 1 should be allowed, as argued above, pending dependent claim 3 should be allowed as a matter of law for at least this reason. In re Fine, 5 U.S.P.Q. 2d 1596, 1608 (Fed. Cir. 1988).

### C. Claims 4 -13

The Applicants respectfully submit that since claims 4-13 depend on independent claim 1, claims 4-13 contain all limitations of independent claim 1. Since independent claim 1 should be allowed, as argued above, pending dependent claims 4-13 should be allowed as a matter of law for at least this reason. In re Fine, 5 U.S.P.Q. 2d 1596, 1608 (Fed. Cir. 1988).

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### II. Newly Added Claims

The Applicants have added independent claim 31 and dependent claims 32-34. Independent claim 31 reads:

31. (Newly Added) A method of coating a substrate with a metal, wherein said substrate comprises individual fibers, the method comprising the steps of:

applying a liquid light-sensitive bonding material to said substrate under lighting conditions to prevent premature curing of said liquid light sensitive bonding material, resulting a portion of said wet light-sensitive bonding material being absorbed into said substrate, and resulting in said substrate being wet;

applying said metal to said wet substrate under lighting conditions to prevent premature curing of said bonding material and allowing said substrate to remain wet, thereby forming a wet metal-coated substrate;

drying said wet substrate at a temperature compatible with said bonding material and under lighting conditions to prevent premature curing of said bonding material, thereby resulting in portions of said metal adhering to a portion of said individual fibers ; and

exposing said dry substrate to a light source having an intensity and for a period of time sufficient to cure at least portions of said light-sensitive bonding material resulting in said metal being intricate with said individual fibers of said substrate.

Independent claim 31 focuses on coating a substrate having individual fibers, with a metal. By using the above-mentioned steps of claim 31, one having ordinary skill in the art is capable of creating a substrate comprising individual fibers having metal applied thereto. Since the light-sensitive bonding material is absorbed into the substrate having the individual fibers, and the metal is applied to the wet substrate, drying the wet substrate and thereafter curing the light-sensitive bonding material causes the metal to become intricate with the individual fibers. As a result, when washing the substrate the metal remains attached to the individual fibers of the substrate. Therefore, by using the steps of claim 31, metal becomes intricate with the individual fibers of the substrate.

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Dependent claim 32 adds the step of washing the coated substrate to remove excess bonding material and excess metal. In addition, dependent claims 33 and 34 further define the form of the metal used in the method of coating the substrate.

**CONCLUSION**

In light of the foregoing amendments and for at least the reasons set forth above, Applicants respectfully submit that all objections and rejections have been traversed, rendered moot and/or accommodated, and that presently pending claims 1, 3-13, and 31-34 are in condition for allowance. Favorable reconsideration and allowance of the present application and the presently pending claims are hereby courteously requested. If in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (603) 668-1400.

Respectfully submitted,



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